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**Assessment of soils and sediments from excavations along Hadrian's Wall,
Appletree, Cumbria (Site Code CAS 648)**

by

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Summary

Field investigations and macromorphological analysis of soils and sediments from excavations across the Turf Wall, and the northern and southern Vallum mounds of Hadrian's Wall at Appletree, Cumbria, were carried out to assess their potential for further analysis.

Field work and observations of samples from the Turf Wall suggested that micromorphological analysis would be useful for establishing the distribution of charcoal in the organic- and mineral-rich layers of the turves for which palynological and archaeo-botanical sampling and investigations were also carried out during the excavation.

Sample and field observations of other contexts showed a high variability in the local glacial till, of which most of the archaeological deposits were composed. This, together with other field considerations, suggested that further laboratory analysis of till deposits from the South Vallum Mound only have a very limited potential. However, the observations suggested that micromorphological analysis of samples from the Northern Vallum Mound accompanied by macromorphological observations of replicate samples, could help to confirm the field evidence of truncation of an in situ soil beneath the Northern Vallum Mound.

All samples for micromorphological analysis are being impregnated for thin section preparation and more information on their full potential will be established with thin section assessment.

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Introduction, aims and questions

During 1999 excavations were carried out by the CAS across Hadrian's Wall at Appletree, not far from the Birdoswald Roman Fort. Until the time of the excavation, there was insufficient evidence for quantifying the extent of damage brought about by arable farming to archaeological contexts below the ploughsoil. Another issue was the need to understand the nature of the pre-Roman landscape both in the area of Appletree and in other areas along Hadrian's Wall (Wilmott, 1999). The above mentioned issues became two of the main aims of the 1999 excavation. Other major aims were to attain evidence concerning the construction and relative age of the Turf Wall, ditch, Vallum and Counterscarp Bank; to establish the existence of any buried land surfaces beneath the Vallum mounds and the Counterscarp Bank; and to assess the potential of this surface for pollen and soil analysis as compared to the known potential beneath the Turf Wall (Wilmott, 1999).

The excavation, similarly to other recent ones by CAS along Hadrian's Wall (e.g. at Black Carts) consisted of a transect through the Wall. The transect crossed the Turf Wall, Counterscarp Bank, Vallum and associated ditches.

The aims of the geoarchaeological investigation were mainly the investigation of two issues:

a) Pursuit of evidence complementary with

/correlatable to the palynological and macro botanical evidence for the composition and construction of the Turf Wall;

b) Establishing whether the Wall earthworks were built on a ground surface which had been truncated by the removal of turf for the construction of the Wall - this would have had implications for the relative dates for the construction of the Wall and the Vallum.

Another aim was to provide complementary soil/sediment evidence to that from the archaeological field analysis and interpretation.

Field evidence and sampling

The major earthwork elements in this and other parts of Hadrian's Wall are described by Wilmott (1999). Of such elements, those brought to light during the excavation at Appletree were, from North to South: the Counterscarp Bank, the Turf Wall, the North Vallum Mound, the Vallum ditch, the South Vallum Mound. The samples collected are listed in Table 1.

The Counterscarp Bank

The archaeological interpretation of the exposed surface of the Counterscarp Bank was that of a stripped ground surface covered by a soil material of a different provenance, likely to represent/include materials from the Turf Wall ditch. The latter contained dark

brown layers, possibly turves from the Wall, overlying bands of clay-rich materials sealing organic-rich deposits.

The Turf Wall

The Turf Wall contained layers of material, mainly turves, arranged on top of each other in a moderately regular succession (Plate 1). The turf layers contained organic topsoils in continuity with their underlying soil horizons, including organic-rich, and mineral (eluvial and B) horizons. Such soil-derived materials, however, were, as expected, all truncated at different depths or cut in different lengths (Plate 1).

Soil studies of the Turf Wall at Appletree have already been carried out by McHugh (1993). New samples for micromorphological analysis were also collected by the present writer during the 1999 excavation, in order to investigate the distribution of charcoal in the organic- and mineral-rich layers of the turves for which palynological and archaeobotanical sampling and investigations were also carried out (by J. Wells and A. Hall, respectively) during the same excavation (Hall, 2000).

In fact, understanding the distribution of charcoal within the turves could give information on the dynamics of turf development and on the timescale between charring and successive turf stripping.

Samples for micromorphological analysis were collected employing Kubiena boxes larger than the standard size (the two boxes without lids in Plate 1) and were located near the point where palynological samples were taken for easy correlation.

The North Vallum Mound

The North Vallum Mound was characterized by materials (Context 25) similar to the local till in the area. At approximately 1.20m depth from the surface of the mound, Context 25 overlay what seemed to be natural *in situ* soil materials, possibly truncated soil profiles, with no evidence for any ground-surface, and formed on *in situ* till (Context 23; Plate 2).

Questions to be addressed were:

- a) are the two Contexts 23 and 25 different from each other and in what respects?
- b) does Context 23 represent a truncated soil profile, stripped of its upper horizons?
- c) does Context 25 exhibit any features suggesting that it has been piled up on top of Context 23?

Loose samples of Contexts 23 and 25, were collected. Due to the extreme hardness of the materials, it was not possible to collect samples with Kubiena boxes. A large undisturbed sample (a soil 'lump'), however, containing both Contexts 23 and 25 in continuity was collected and some general soil characteristics (colour, texture, horizons) were described on-site.

The South Vallum Mound

The northern side of the South Vallum Mound, was characterized by the presence of a marginal mound. Below this, the surface of the side of the South Vallum Mound sloping down into the Vallum ditch consisted of two different layers, the upper of which was separated from the lower by an irregular clear gradual, sub-horizontal boundary. Though these two layers were both similar to the local till, they differed from each other in consistency and colour, the lower deposit being more being more yellow and coherent



Plate 1. Samples from the Turf Wall. The two samples without lid are Sample 1 (left) and 1a (right), located near a sample for pollen analysis (far right).



Plate 2. Contexts 23 and 25 in the Northern Vallum Mound. Sample 2 included the two contexts and their boundary, whilst Sample 4 was collected from Context 23, above Context 25.

upper. This may have different interpretations:

a) what was visible in the surface represented what was also at depth within the mound, implying that lower part of the South Vallum Mound comprised two different deposits.

b) what was visible on the surface did not reflect the inner composition of the mound, and only represented a feature of the surface of the north side of the mound.

To investigate this issue, loose Samples 5 and 6 (CAS Samples 912 and 913, respectively, both part of Context 23) were collected and, later on, the CAS excavated below the surface, into the mound.

The marginal mound consisted of what was interpreted by the archaeologists as soil materials, overlying laminated/layered deposits (Context 11), in turn overlying till. Though the peds and porosity of the upper material confirmed the identification of a soil, the nature of the layered material was obscure, and it did not make sense that aquatic deposition could occur and result in a layered sediment in such an elevated position. The archaeological interpretation was that the material had been collected elsewhere and used to build the mound. Samples collected included: Sample 8 (CAS 909) from the upper context, in order to carry out a standard soil description, Sample 7 (CAS 900) from Context 21, in order to investigate the type/nature of layering, possibly with micromorphological analysis, and Sample 9 (CAS 907) from the till, for comparison.

The upper and central part of the South Vallum Mound seemed to consist of till, again arranged in two seemingly different deposits. Samples included: Sample 10 (CAS 910) from the upper deposit, and Sample 11 (CAS 911) from the lower deposit.

Discussion and statement of potential

As a result of the natural variability of the local till, as it was specifically observed at this site, there would be severe limitations to the interpretation of laboratory analysis of such samples as Samples 10 and 11 from the till in the South Vallum Mound, Samples 8 and 9 of the till beneath the marginal mound of the South Vallum Mound, and Samples 3 and 4 of the till from the North Vallum Mound. In fact, though macro- and possibly micromorphological analysis of the samples may help to establish to what extent they are similar, that differences and features observed with such detailed analysis would not easily be resolvable as separate from natural till variability, as detailed in the following discussion.

Northern Vallum Mound

As it has been described above, samples from Contexts 23 and 25 from the northern Vallum Mound were collected for comparison and for confirming whether a ground surface was missing from the *in situ* material of Context 23. Such an absence of ground surface was apparent on site and, since the seemingly *in situ* soil underlying Context 25 did not have any clear evidence for a top-soil, it is reasonable to suggest that such material was stripped off before piling up further till materials.

The above, however, is only a suggestion and, unfortunately, the high variability of the local till would limit the significance of further analysis of the loose Samples 3 and 4 (Table 1) for confirming such a suggestion. However, if the observation and description of Samples 3 and 4 is accompanied by the micromorphological analysis of Sample 2 (containing Contexts 23, 25 and their

boundary), this may help to contribute to establish the nature of the boundary between Contexts 25 and 23, and highlight truncation or, alternatively, gradual change - interpretations being still limited, however, by till variability and the small size of thin sections.

South Vallum Mound

After the site visit of the present investigator, the CAS carried out further digging into the South Vallum Mound and confirmed that the material from which Sample 5 was collected only represented a superficial deposit which was not represented in the internal part of the mound. In other words, this confirmed hypothesis b), rather than a) described above in 'Field evidence and sampling'. Thus, further analysis of Samples 8 and 9 has no potential to augment the interpretation.

It does not seem that analysis of the samples from the marginal mound of the South Vallum Mound could give any new evidence, either: the archaeological interpretation of the layered material was that it had been transported from elsewhere, and the interpretation seemed to be in total agreement with simple soil/sediment observations in the field. Also, in order to establish the provenance of the layered deposit, detailed information on the location of similar laminated deposits in the vicinity or, failing this, a survey of the surrounding (or other) areas would be necessary. Obtaining such information is not readily achievable and is perhaps beyond the aims of this work.

Samples from the Turf Wall

Micromorphological analysis of the Turf Wall materials adjacent to those sampled for pollen and plant macrofossil analysis has

clearly the potential to establish the presence, vertical distribution, size and state of the charcoal within the turves. This will help to establish further evidence on the make up of the Wall, and on the relative timescale and dynamics of turf formation, use and stripping.

Recommendations

To summarize, it seems that analysis of the layered deposits of the South Vallum Mound, as well as of till samples from the South Vallum Mound, would only have very limited potential, whilst there is some potential in the micromorphological analysis of Sample 2 (accompanied by macro-morphological observations of Samples 3 and 4). Also, there is significant potential for the micromorphological analysis of Samples 1 and 1a from the Turf Wall.

Thus, micromorphological analysis of Samples 1, 1a and 2 is recommended subordinately to the assessment of thin sections, and in parallel with macro morphological analysis of Samples 3 and 4. Samples for micromorphological analysis are being impregnated for thin section preparation and their full potential can be established with assessment of the sections.

Retention/disposal

The undisturbed and loose samples listed in Table 1 are stored at the EAU and should be retained for the time being.

Archive

Data, reports, diagrams and photographs are retained at the EAU.

References

McHugh, M. (1993). *Soils at Birdoswald: the environment and site function*. Unpublished report.

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Table 1. Geoarchaeological samples collected

<i>Sample No</i>	<i>CAS Sample No</i>	<i>Contexts</i>	<i>Notes</i>
1		53; ?	West-facing section of Turf Wall. Depth from top of wall: 42.5-52.5 cm. Northernmost of two Samples 1 and 1a. <i>Kubiena box</i> .
1a		53; ?	West-facing section of Turf Wall. Depth from top of wall: 25-34cm. Southernmost of two Samples 1 and 1a. <i>Kubiena box</i>
2		23;25	<i>Large undisturbed lump</i> (North Vallum Mound).
3		3	Natural till (North Vallum Mound). <i>Plastic bag</i>
4		25	Context on top of till (Context 23) in North Vallum Mound. <i>Plastic bag.</i>
5			Upper part of north-facing side of marginal mound (South Vallum Mound). <i>Plastic bag.</i>
6			Lower part of north-facing side of marginal mound (South Vallum Mound). <i>Plastic bag.</i>
7	908	11	In layered context of marginal mound (South Vallum Mound). <i>Plastic bag.</i>
8	909		Soil above Context 11 in marginal mound (South Vallum Mound). <i>Plastic bag</i>
9		21?	till below Context 11 in marginal mound (South Vallum Mound). <i>Plastic bag</i>
10	10	910	Upper till in South Vallum Mound. <i>Plastic bag.</i>
11	911	23	Lower till in South Vallum Mound. <i>Plastic bag.</i>